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ABSTRACT

This paper reviews evidence of the effects of early childhood intervention programs on primary school progress and performance of children from poor families in developing nations. The paper begins with a discussion of the logic underlying investment in early intervention, based on the situation of children, the nature of the typical primary school experience, and the value of completing a primary education. Subsequent discussion examines evidence from the United States that demonstrates some long-term effects of early interventions, and explores the generalizability of the evidence to the developing countries. Finally, data are reviewed which were obtained from early intervention program evaluations in developing countries, especially Latin America, and policy suggestions are set out which are geared toward establishing a sound program of investment in early childhood care and development. The review of evidence from the developing countries represents a first attempt at drawing defendable generalizations about the effectiveness of early childhood interventions in enhancing children's school careers in these nations. (Author/RH)

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Effects of Early Childhood Intervention On Primary School Progress and Performance in the Developing Countries

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Introduction

In this paper we review evidence of the effects of early childhood intervention programs on primary school progress and performance of children from poor families in the developing countries. The paper begins with a discussion of the logic underlying investment in early intervention, based on the situation of children, the nature of the typical primary school experience, and the value of completing a primary education. We then examine evidence from the United States that demonstrates some rather dramatic long-term effects of early interventions, and discuss its generalizabilty to the developing countries. Finally, we review the data we were able to find from early intervention program evaluations in the developing countries, and then set out policy suggestions geared toward establishing a sound program of investment in early childhood care and development.

Before turning to the review itself, several preliminary points require emphasis:

1. We recognize that improving primary school outcomes is only one of many purposes early intervention programs can serve. Improving children's physical health, providing child care for working parents, rehabilitating developmentallv disabled children, inculcating particular moral, political, or religious values, and generally improving children's current quality of life are other important purposes for supporting programs for young children. But it is the promise of easing the child's transition from one social world to another that remains most compelling as an argument for investment in early childhood intervention programs.

2. Ours is a programmatic focus on the results of planned interventions. Our review of basic research is selective, and is meant to illuminate the causal logic of investment in early childhood programs. We define early intervention as activities designed specifically to enhance the physical, mental and/or social development of a child in the early years, from birth to 6. The interventions reviewed in this paper are diverse, ranging from small-scale nutrition supplementation and stimulation programs, beginning at birth and involving home visitors, to large-scale public programs of center-based preschool education for children from 4 to 6 years of age; all focus on service to poor children and families.

3. A review of early childhood intervention effects is particularly timely at this moment, for a number of reasons:

a. Programs of early childhood care and development have mushroomed in number in recent years (Mauras, Latorre, & Filp, 1979; Halpern, 1980; Prakasha, 1984; King & Myers, 1983). Experimentation is widespread, and in many countries interventions are already "going to scale". In Brazil, for instance, it is estimated that coverage for child care programs has increased from 1 to 3 million children during the last four years (UNICEF/Brazil, 1984). In India, the Integrated Child Development Service, which began in 1975 in 33 districts, expanded to more than 800 districts by 1984. By the end of 1985 the program is expected to have reached 3 million children with preschool education (UNICEF/India, 1984). From 1968 to 1984 enrollment in Kenyan self-help preschool institutions increased from 180,000 to 500,000 children (Bernard Van Leer Foundation, 1984). In Peru,

coverage formal and non-formal programs of "Initial Education" increased from about 140,000 children in 1974 to over 500,000 in 1984 (Fujimoto, 1984). With literally hundred of small- and large-scale initiatives underway or being planned, the demand has grown for information about the kinds of programs most likely to be effective.

b. The massive push to universalize primary education in the developing countries has brought with it renewed concern about drop-out, repitition, differential enrollment (by sex), and generally low performance levels (UNESCO,1984). Some critics place blame on the child and family, and, accordingly, seek interventions that would better prepare the child for school. Others blame the schools, and feel that early intervention investments are not warranted until primary school systems are improved. We will examine both sides of this question, as we review the evidence and policy dilemmas.

c. Throughout the 1970s international donor interest in early intervention was considerably dampened by negative or inconclusive findings from the first round of American evaluation studies. A standard interpretation was that short-term effects "washed out" (Bronfenbrenner, 1974). However recent U.S. evidence suggests that important long-term educational and social benefits do accrue from some kinds of early interventions. As impressive as these results may be (see later discussion), the question remains whether, and under what conditions, similar outcomes can be expected in developing countries.

4. We view this paper as a point of departure, rather than as a definitive statement. In the coming months, we hope the paper will both stimulate discussion and help to uncover relevant sources of information we have missed in our search. The section of the review dealing with developing country evidence, for instance, depends far too much on Latin American program reports. With feedback and additional evaluation results in hand, we expect to update, broaden, and re-interpret what appears here.

The Logic Underlying Investment in Early Intervention Programs

Before directly examining evidence of the particular role early intervention programs might play in improving school and life outcomes in the developing countries, we will review briefly the debate on the relationships among child and family background, school inputs, school progress and performance, and adult success. In general, this debate concerns the relative importance of child characteristics and school characteristics in influencing children's school careers in the developing countries; and the value of schooling in determining adult outcomes. Figure 1 presents a schematic view of the relationships to be examined.

Determinants of Primary School Enrollment, Progress, and Performance

A large number of variables have been identified in the literature as important influences on children's school progress and performance in the developing countries. We list those variables in Table 1, and then describe how they intereact in the discussion on the following pages.

Child and Family Characteristics

There is considerable evidence that the physical, cognitive,and social characteristics a child brings to the schooling experience are important determinants of the success of that experience. These child characteristics are the sum of many influences. But for children in the developing countries they are shaped most powerfully by the consequences of poverty in early childhood— malnutrition, morbidity, and parental care-giving focused on survival.

It has been estimated that 40 percent of the 500 million children under 6 years of age in the developing countries suffer from chronic protein-energy malnutrition, and 12 percent from severe, acute malnutrition (Rhode, 1983). Both forms of malnutrition impair children's physical growth, and cognitive and social development in ways that are relevant to their adjustment to school demands (Pollitt, 1984; Richardson, 1980). Malnutrition, often acting synergistically with infection, reduces the amount and quality of learning time in the early years. Malnourished children are less active, less able to concentrate on learning activities, and less interested in the environment than are well-nourished peers (Pollitt & Thompson, 1977). They may also be less socially attractive to caregivers, further reducing their ability to evoke positive and stimulating responses from those caregivers and the broader social environment. For most malnourished children in the developing countries, the associated loss and reduced quality of learning time in early childhood results in impaired school readiness.

Parents can play a crucial role in ameliorating or exacerbating the effects of malnutrition in their young children. Decisions to breast or bottle feed in infancy, management of diarrhea, follow-through with immunizations, and a host of related parental behaviors contribute significantly to the variance in growth and health found within populations of impoverished children (Grant, 1985). The way income is distributed

Figure 1

Schematic View of the Origins of Adult Achievement in the Developing Countries

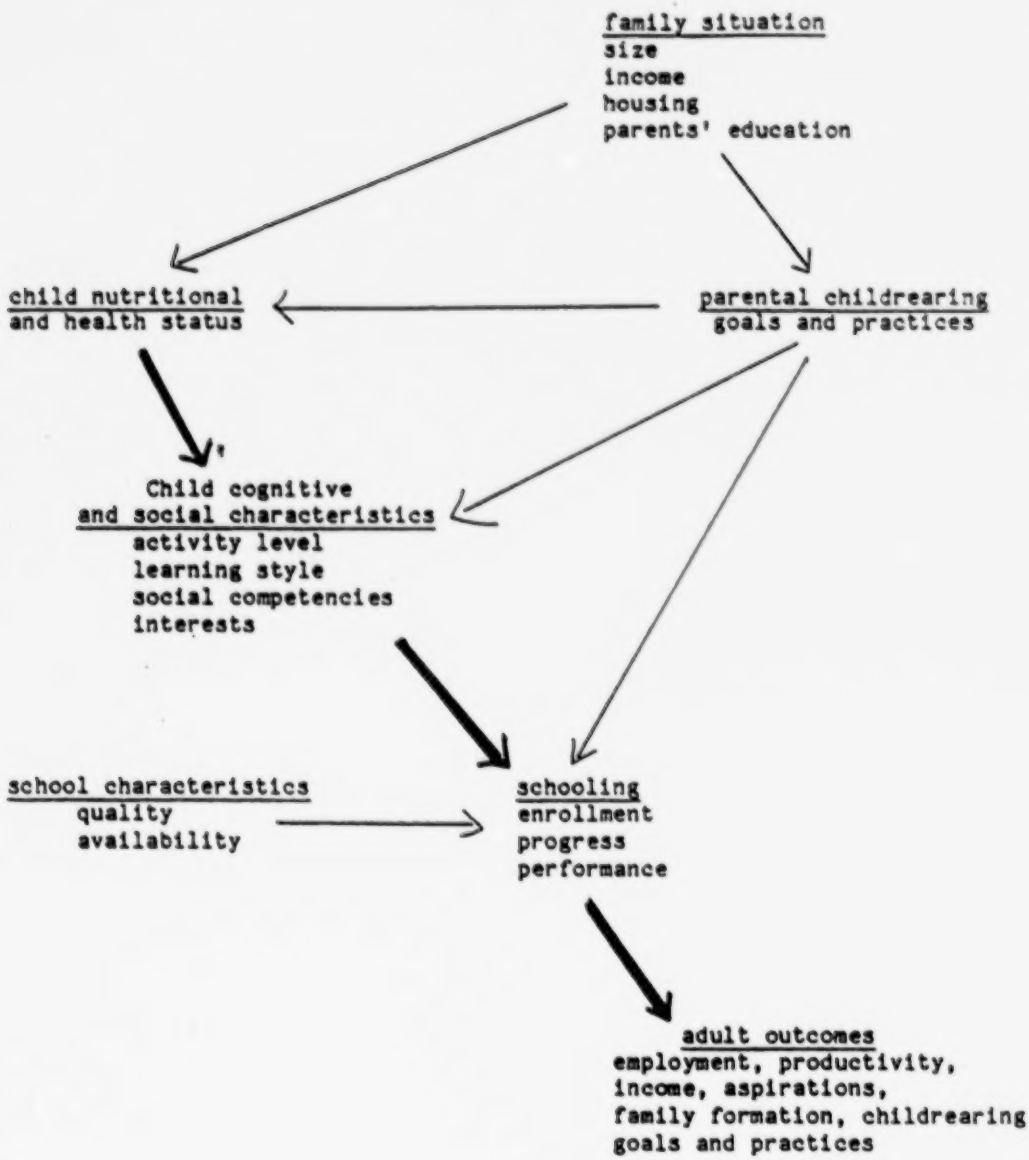

Table 1

Determinants of Primary School Enrollment, Progress and Performance in Developing Countries

Enrollment (Initial and Annual)	Progress (Promotion)	Performance (Achievement)
gender	cognitive/social readiness (skills) at entrance	quality of teaching
parental perception of readiness/abilities	attendance	availability and quality of textbooks
child's health history and current health status/	nutrition and health history	percentage of total potential learning time used by child and teacher
birth order/ family size	current physical health, nutritional status	child self-concept and motivation
language at home	age at enrollment	quality of home environment
parents' occupation	non-school demands on a child's time	class size
parents' education	teacher characteristics	linguistic competence in language of instruction
non-school demands on a child's time	linguistic competence in language of instruction	parents' teaching style
parental aspirations for a child	teacher ratings of cognitive skills and social attractiveness	
distance from school	standard exam scores	
availability of places in school	promotion policies	
school tuition; cost of uniforms, books, etc.	availability of places in next grade	
	quality of classroom process	
	parents' occupations and education	
	parental aspirations for a child	
	family stability/mobility	
	parents' teaching style	

Sources: Brimer & Pauli, 1971; Beirn, Kinsey, & McGinn, 1972; Haddad, 1979; Hetneman & Loxley, 1983

within the family can affect the child's welfare, including nutritional status. Unfortunately, malnourished children are also likely to come from the most socially deprived home environments in a neighborhood or community (Richardson, 1980).

The cognitive skills that parents inculcate in their children are not always consonant with those skills that school will demand. For example, parents may promote primarily concrete use of language and concrete classification skills, whereas schools demand relatively more abstract and representational use of language, and classification skills based on more abststract qualities of objects (Haglund, 1982). There is evidence that explicit literacy-nurturing activities are not a part of most poor children's early childhood experience in the developing countries (Pollitt, 1984). To the extent that this is true, the transition to the abstract and disembedded learning that is typical of schooling will be a traumatic one for these children.

A team of researchers in rural Guatemala has examined the interaction of child and parent characteristics, as these affect primary school progress and performance (Irwin, et al, 1978). This basic research was part of a longitudinal study that examined the effects of nutritional supplementation in 4 rural villages (to be described later). The researchers in this study found that parents' perceptions of early intellectual ability in their children, which generally seemed to be accurate, led to earlier enrollment (for girls and boys) and greater likelihood of enrollment at all (for girls).

It was found that parental education levels and mothers' "modernity" were also associated with parents' schooling decisions for their children. In a more dynamic vein, the quality of children's home stimulation during the early years was strongly associated with primary school performance, especially for boys. (Because a more select group of girls attended school, there was less variance in their achievement.) It was found in these generally poor villages that even slight differences in economic status affected family ability to cope with the costs of children's education. In summary, the researchers found that under the marginal socio-economic conditions found in rural Guatemala, parents simultaneously juggled many variables to estimate the costs and benefits of different uses of their children's time. Parents appeared to select children for particular roles and particular futures, in an attempt to optimize inadequate household resources.

Child and family characteristics do not just affect the child's initial adjustment to the demands of schooling, but continue to be influential during the school years. Poor nutritional and health status during the primary school years, for example, has been found to affect negatively the child's level and quality of activity in school, as well as school attendance patterns (Moock & Leslie, 1984; Popkin & Lim-Ybanez, 1982). The irritability, listlessness and distractibility of the hungry, malnourished school child have been widely noted. Berg (1981) reports that in some Latin American countries children miss as much as a third of scheduled school days a year due to illness and poor health.

School Characteristics

School characteristics also have been reported in numerous studies to have a significant effect on children's primary school progress and performance in the developing countries (Heyneman & Loxley, 1983; Haddad, 1979; Schiefelbein & Farrell, 1978). Regardless of what physical, cognitive and social characteristics a child brings to school, he or she will not learn much in a class of 50 children with no textbooks, and a teacher with the equivalent of a high school education— a situation not atypical at the primary school level in developing countries.

The constraints on children's progress due to school characteristics are often straightforward: for example, when there are fewer "places" in each succeeding grade in a primary school. Empirical research has demonstrated that such concrete interventions as increasing the number and improving the quality of textbooks can significantly enhance aggregate learning and school performance (Heyneman, Jamison, & Montenegro, 1984). What we do not adequately understand is how teachers, schools, and school systems select some children for promotion, others for retention; and we know relatively little about teachers' understanding of their roles and their responsibilities to individual children.

For example, teacher grades are commonly used to promote some children, and retain others. How do teachers arrive at these grades? There is anecdotal evidence that criteria are not solely, or even largely based on achievement. Number of days absent, skin color, dress and social behavior have all been found to be factors (Filp, et al, 1983). In some settings the child's first year in first grade may be viewed as a preparatory year, the second year in first grade as the "real" year (Myers, 1985). It would seem that teachers have to consider the number of available places in the next grade in school, in assigning children grades above or below a cut-off point for promotion.

Teachers apparently do not blame school conditions— including their own lack of skills— for high repitition rates (Toro, 1983). They tend to blame parents or the children themselves. Nonetheless, in one school-level study an association was found between teachers' observed skills and numbers of children in a class repeating: the better the skills the fewer the repeaters (Pozner, 1983). Teachers may be more willing to blame school conditions, especially class size and scarcity of textbooks, for children's lack of learning.

In sum, in developing country contexts, both the individual effects of poverty on children and the macro-effects of societal poverty on the amount and quality of school resources, seem to affect negatively children's primary school progress and performance. Which is more important? And therefore how plausible is early intervention as an approach to improving children's primary school progress and performance? In our view, both are important. We would argue that under the conditions described above investment decisions should not be taken in an either-or framework. Early childhood and primary education investments in the developing countries will be closely linked in their usefulness and productivity. Investment in one maximizes the productivity of investment in the other, especially if there is continuity between the two in purpose, philosophy, and pedagogy.

Effects of Schooling on Child and Adult Characteristics

The next important link in our causal chain proceeds through schooling to changes in individual psychological and social traits; and ultimately to increased adult productivity. Even if investment in early intervention programming can be demonstrated to improve children's school progress and performance, the benefits in adulthood of that improvement in school attainment are crucial to the logic of that earlier investment.

The larger society-level relationship between educational expansion (i.e. more graduates at each level) and economic development is not straightforward. In fact, the evidence suggests that educational expansion tends to increase the number of credentials required for a particular job, and has little effect on the occupational structure (Walters, 1979). Nonetheless, for the individual even minimal quality schooling appears to make a significant positive contribution to cognitive flexibility and social skills; and to occupational attainment, particularly initial attainment (LaBelle & Verhine, 1975; Colclough, 1979).

Among the skills attributable to schooling are: selectivity in use of information; ability to work alone, without family or friends; the ability to transfer knowledge from one situation to another; the ability to organize discrete bits of information into meaningful categories; the ability to shift to alternative dimensions of classification or explanation (Rogoff, 1980; Triandis, 1980). Schooling may contribute to, and conversely demand, what Raizen and Bobrow (1974, p. 127) call meta-cognition in the child: "an awareness of what one knows, needs to know, and how to get needed knowledge from external sources (parents, peers, teachers, books, displays, etc.) and internal sources (memory search strategies)." In other words, schooling may make a difference in what children do with available information.

The usefulness of the kinds of cognitive abilities enhanced through schooling depends on their usefulness in the child's everyday life, in the present, and the likely future. For many children "formal schooling is, to a large degree, the struggle to substitute one kind of tradition (or knowledge) for another within the mind of the child" (Wax & Wax, 1971, p. 15). It cannot be assumed that such a replacement is desirable as a social goal (for example, increasing children's willingness/motivation to achieve, inevitably at the expense of others). It is a question each society must ask itself, in the context of ongoing processes of social change and development. It does appear, nonetheless, that when a child interacts with a greater variety of developmental settings, he or she has an opportunity to develop a greater repertoire of skills and abilities.

In a review of economic effects of primary schooling, Colclough (1979) finds that for the individual a modest amount of schooling affects social and motivational traits in ways that employers find attractive. (At lower levels of both employment and schooling, traits like punctuality, obediance and respect for authority may be most important. At higher levels, traits like initiative and self-reliance become important.) Colclough notes also Inkeles' work on societal modernization and its relation to a "modern" outlook in individuals. In this work Inkeles found both that schooling was

the most important contributor to a modern outlook in individuals, and that schooling effects are "cumulative and continuous"; even small amounts have noticeable effects.

Completion of primary education appears to have a positive effect on farmer productivity (especially combined with other changes in the farming environment); and on productivity in the informal market sector. It increases the likelihood of migration to urban centers, a phenomenon rational for individual families, but often irrational from society's perspective (Colclough, 1979; Lockheed, Jamison, & Lau, 1979). Schooling may also contribute, in individuals and in the aggregate, to greater technological adaptiveness (Grawe, 1979).

Attention has been paid recently to the effects of schooling on the nature of parental investment in their children. Completed primary education is associated with decreased fertility (Birdsall, 1980; LeVine, 1980). Mothers with a primary education have been found to engage in more appropriate infant and child health care practices than peers with little or no schooling. Mothers with more schooling tend to have teaching styles more congruent with those their children will experience in school. As Laosa notes (1982, p. 800) "the family and its children develop a characteristic way of dealing with each other in teaching-learning situations....to the extent that relational systems of family and school differ, the child and the school teachers will be unable to draw on a shared process of teaching and learning."

In sum, a complete primary education is associated with a variety of social and economic benefits to individuals in developing countries. Most generally, it provides a credential that is an essential pre-requisite to many jobs; under some circumstances it also inculcates skills and attitudes that improve opportunity for occupational advancement. Thus, to the extent that early childhood intervention programs could improve poor children's chances of completing primary school, such programs are an investment that is likely to yield meaningful returns.

Review of the Evidence of Early Childhood Intervention Effects

Before proceeding to a discussion of the effects of early intervention programs in developing country contexts, we will review the evidence from the United States, and examine its generalizability to the developing countries. Long-term effects found in U.S. studies pose a challenge to international donor and developing country decision-making, given severe resource constraints on public budgets, in the face of a variety of important development needs, in developing countries. Moreover, the U.S. findings are based on a much more mature body of experience than the available evidence from the developing countries.

Evidence from the United States

While belief in the compensatory value of early childhood intervention has led to a proliferation of programs throughout the industrialized world, only the United States has supported a sustained program of empirical research on the effects of early childhood intervention. At the heart of this research tradition is a group of small-scale experimental and quasi-experimental studies that have managed to follow both treatment and control children through their school careers (Clement, et al, 1984; Gordon & Jester, 1980; Gray, Ramsey & Klaus, 1982; Levenstein, O'Hara & Madden, 1983; Palmer, 1983). Supplementing this group are two studies with somewhat less convincing research designs, that have also managed to collect data on children's progress through their school careers (Monroe & McDonald, 1981; Irvine, 1982).

Also relevant to the present review is short-term evidence from evaluations of Head Start (the major American early childhood service program) that have followed children into primary school (Harrell, 1983). And we will review evidence of effects of Title I "K through 3" compensatory education programs (Carter, 1983).

Longitudinal Studies

Program descriptions and research designs for each of the longitudinal studies cited above is presented in Table 2. The experimental/quasi-experimental group of studies were all initiated in the 1960s. Most have managed to limit attrition, and assure the continued comparability of program and control groups. The initial emphasis in these evaluations was on I.Q. effects, and in fact immediate post-treatment I.Q. gains of one half to one standard deviation (8 to 16 points) were found for many children in these programs. But these gains disappeared within two to three years of program completion. This lack of sustained I.Q. effects for the experimental programs was highlighted in the political arena by an early negative evaluation of Head Start by the Westinghouse Learning Corporation and Ohio University (Cicirelli et al, 1969).

Nonetheless, as the children in the experimental studies proceeded through primary school, evidence of positive effects on adjustment to the demands of formal schooling began to mount. Now, with the majority of children in early or late adolescence, there is strong evidence that

Table 2

Important Program and Research Design Features, Longitudinal U.S. Studies of Early Childhood Intervention Effects

Study	Year Initiated	Program Features	Beginning Age of Children	Sampling Procedures	Original Sample Size	Percent Attrition	Child Age at Last Report	Recent Major Reference
Early Training	1962	10 week summer program for children, 20 hrs per week; weekly home visits; children participated for 2 of 3 years	3 or 4 years	random assignment	90	20%	21	Gray, Ramsey,& Klaus, 1982
Perry Preschool	1962	For children: half-day program, 5 days per week, Oct.-May.; weekly home visits; children participated 1 or 2 yeears	3 or 4 years	random assignment	123	2%	19	Clement, et al, 1984
Mother-Child Home	1965	92 half-hour home visits for 7 months per year, for 2 years, work jointly with parent and child	2 or 3 years	assignment by neighborhood	250	26%	9-13	Levenstein, O'Hara, & Madden, 1983
Florida Parent Education	1966	weekly home visits by trained para-professional for 1, 2, or 3 years; plus cluster home visits	3-24 months	random assignment	309	65%	11	Gordon & Jester, 1980
Harlem, Research Center	1966	one-on-one sessions, child with tutor, 2 hours a week for 8 months, for 1 year	2 or 3 years	control children selected from later cohort, same pop.	315	19%	13	Palmer, 1983
Rome, Georgia Head Start	1966	part-time Head Start program Jan.-Aug., a one year program	5 years	retrospectively constructed control group of school peers (possible self-select bias)	218	59%	20	Monroe & McDonald, 1981
New York Pre-K	1975	classroom program part-time, daily, for one year	4 years	assignment by site	2058	25%	9	Irvine, 1982

participation in well implemented early childhood education programs can have significant long-term effects on progress through the school career, as measured by promotion, need for special education, and high school completion. This evidence is summarized in Table 3.

There is little evidence in these studies--except in one, the Perry Preschool Project--of enduring effects on school achievement. The Perry investigators were the only ones to administer achievement tests themselves in a standardized manner to study children during their school careers. In the other studies differences in tests used, timing and procedures of testing may have diluted what achievements effects there were. Generally, there is no clear explanation in the study reports for the discrepancy between school progress effects and school achievement effects.

Likewise, there has been little analysis of the causal mechanisms leading to those long-term effects that have been found. One reasonable, but speculative, causal explanation is provided by Lazar, et al. (1982, p. 64):

> Many factors influence and are influenced by school performance, including children's ability, their level of motivation, teachers' expectations and treatment, and children's self-esteem and feelings of autonomy and control. It is possible that early education gave the children just enough of a "boost" that all these mechanisms tended to operate positively. Perhaps early education taught these children some concrete cognitive skills and also exposed them to some school-relevant non-cognitive skills such as attentiveness to teachers, ability to follow instructions, and task perseverance. When the children entered first grade they had positive attitudes towards classroom activities, were able to adapt to classroom procedures, and were able to learn and do the schoolwork. The public school experience, in short, was also positive. The children's positive attitudes toward school were reinforced; they felt competent. In all probability their teachers identified them as competent and treated them as such. Once set in motion, success tended to breed success....

Short-term cognitive gains were not irrelevant, in this view. In fact, along with certain enhanced social skills, they were the catalyst that evoked from children a commitment to schooling, and set children on a positive transactional course.

One of the longitudinal studies, the Perry Preschool Study, also measured social adjustment of program and control children on non-school variables. Program children were found to have less self-reported delinquent behavior, fewer contacts with the juvenile justice system, and fewer arrests. At age 19, 45 percent of the program group were supporting themselves by their own (or spouses') earnings, versus 25 percent of control group. Mean annualized welfare payments to the program group members was $633, for control group members $1509. Pregnancy rates for women were such that, if there had been 100 women in each group, program group women would have had 64 pregnancies and control group women 117 pregnancies during their teenage years (Schweinhart, et al, 1984).

The Perry Study was also unique in that it has conducted a cost-benefit analysis of investment in early childhood intervention. The

Table 3

The Longitudinal U.S. Studies:
Findings for School Progress

	Study	Program Group	Control Group	p[a]
1.	Early Training (age 18)			
	Placed in special education	3%	29%	.004
	Retained in grade	53%	69%	—
	Dropped out of high school	22%	43%	.079
2.	Perry Preschool (age 19)			
	Placed in special education	37%	50%	—
	Retained in grade	35%	40%	—
	Dropped out of high school	33%	51%	.034
3.	Florida Parent Education (age 11)			
	Placed in special education	23%	54%	.024
	Retained in grade	28%	29%	—
	Dropped out of high school	No data	No data	No data
4.	Mother-Child Home (age 9)			
	Placed in special education	14%	39%	.005
	Retained in grade	13%	19%	—
	Dropped out of high school	No data	No data	No data
5.	Harlem (age 13)			
	Placed in special education	No data	No data	No data
	Retained in grade	24%	45%	.006
	Dropped out of high school	No data	No data	No data
6.	Rome Head Start (age 20)			
	Placed in special education	11%	25%	.019
	Retained in grade	51%	63%	—
	Dropped out of high school	50%	67%	.042
7.	New York Pre-K (age 9)			
	Placed in special education	2%	5%	.006
	Retained in grade	16%	21%	.019
	Dropped out of high school	No data	No data	No data

[a] Two-tailed p-values are presented if less than .100.

analysis included costs of the program (in 1981 dollars, discounted at 3 percent annually); and costs avoided for reduced repetition, special education, welfare and crime through age 19; benefits calculated included actual earnings up to age 19, and projected lifetime earnings based on educational attainment, among other factors. The analysis found that benefits (to society and the individuals) exceeded costs by a factor of 7 to 1 for 1 year of early childhood education, 3.5 to 1 for 2 years.

Evaluation of Head Start

A number of short-term evaluations of "typical" Head Start programs throughout the United States have followed children into primary school. Harrell (1983) conducted a meta-analysis of 71 reports of research on such programs, selected from a much larger number, based on adequacy of documentation. Using meta-analytic techniques, she examined effects on I.Q., on developed abilities at point of entry into school (school readiness) and on achievement at the end of the early grades. She found evidence of positive Head Start effects in all 3 domains, with the largest effects on school readiness measures (such as the Caldwell Preschool Inventory), the smallest on achievement at the end of grades 1, 2, or 3.

Harrell concludes that Head Start "does, indeed, enhance the cognitive development of children" (p. 4). But her own data undermine this conclusion. Harrell reports that the majority of studies employed pre-post designs with no control group, and that effect sizes found for these designs were 7 times greater than those found in treatment-control comparisons (.61 vs. .09). Harrell herself notes (p. 60): "Although controls for maturation were included in calculating the effect sizes [in studies with no control group] the magnitude of this gain relative to the others suggests either that the children gained extremely rapidly or, more plausibly, that the controls used were insufficient."

Evaluation of Title I

Complementing the investment in preschool compensatory education in the United States has been an investment in compensatory education in the primary grades under Title I of the Elementary and Secondary Education Act of 1965 (now called Chapter I). Under Title I children in grades K-6 who test below certain criterion in school readiness and later achievement receive special instruction, generally in math and reading, principally through "pullout" sessions with small instructional groups. Poor and non-poor children are eligible, although monies are targeted to schools with high percentages of poor children. The cost of Title I per year per participating student is about $500. (Head Start, a much more comprehensive program, costs an average $2700 per student annually.)

The major evaluation of Title I was the so called "Sustaining Effects" study (Carter, 1984), actually a compilation of 5 related studies. The heart of this evaluation was a longitudinal study of achievement for a sample of about 3000 Title I students and about 2500 regular students (some eligible for Title I, others ineligible). Title I participants demonstrated a significantly greater rate of gain than eligible, non-participating peers in math skills throughout the primary school years, and in reading skills until the end of grade 3. Participants' rate of gain was at least equal to that of "regular" (non-needy) students, although their

absolute achievement scores remained much lower. Relatively lower-achieving Title I participants benefited less than relatively higher-achieving ones. Carter reports (1984, p. 7): "By the time students reached junior high school there was no evidence of sustained or delayed effects."

Infant Interventions

We will touch on one further group of U.S. studies, those examining effects of investment in prenatal and infant intervention programs. The majority of these programs work with parents in the home, and they tend to have a relatively greater focus on parent education in health, nutrition and home stimulation than do preschool programs. Evidence from reviews of these programs (Anderson, Fox, & Lewin, 1983; Halpern, 1984; White & Casto, 1984) suggests that they do have beneficial short-term effects on parent childrearing behaviors and coping skills, and somewhat less consistently on pregnancy outcomes, infant health and development. Only a few prenatal and infant intervention programs have followed children into their school years (e.g., Epstein & Weikart, 1979). The little available evidence suggests that intervention prenatally and in infancy, without continued intervention in the later early childhood years, does not affect school progress and achievement.

Summary and Generalizability of the U.S. Evidence

Summary. The U.S. evidence suggests that in the U.S. context small-scale, experimental early childhood intervention programs for poor children provide a variety of short- and long-term benefits to participants and to society. When monetarized these benefits exceed costs by a factor of at least 3 to 1. It is uncertain whether more typical early childhood service programs, notably Head Start, have the same magnitude and kinds of effects as experimental programs. Evidence from the Harrell review and the two longitudinal evaluations of service programs (Rome, Georgia Head Start; New York State Prekindergarten) suggests that the kinds of effects obtained are the same, but the magnitude is smaller.

With respect to an investment strategy focused on improving the quality of primary school instruction for poor children, in the U.S. context of a generally well-developed primary education system, the marginal improvements from such extra investment appear to be modest. It does appear, though, that within the K-6 framework, extra investment "is more effective in the lower grades than in the higher grades" (Carter, 1984, p. 7).

Generalizability. A variety of factors limit the generalizability of the U.S. evidence to the developing countries. The debilitating health and developmental effects of poverty on young children in the developing countries are more powerful and pervasive than the effects of poverty on young children in the U.S. (This is not to minimize the harm that growing up in poverty does to American children.) Poor children and their families in the developing countries do not have access to the variety of medical, social and income support programs that buffer the effects of poverty for families in the U.S. In other words, the preventive and compensatory work that an early childhood intervention program has to undertake in the

developing countries is greater than that of a similar program in the U.S.

The conditions of schooling in the developing countries— large classes, few instructional resources, often poorly trained teachers, an inadequate number of "places" in each grade— are such that the newly acquired skills that preschool participants bring to primary school may be less influential than in the U.S. in shaping the course of children's school careers. When promotion policies are only loosely tied to children's abilities, when there is no special education to be "avoided", and when there are resources for only 10 or 20 percent of primary school participants to complete secondary school, positive long-term effects on the course of children's school careers found in the U.S. may not be replicated in developing countries.

Nonetheless, it is reasonable to expect that developing country primary school systems are at least modestly sensitive to the kinds of skills and characteristics children bring with them; and conversely that children are differentially adaptive (due both to physical health and psychological make-up) to the demands of the school setting. In other words, the causal mechanisms at work in the U.S. context may work in similar ways in the developing countries, albeit much more weakly, and with many more pre-conditions attached. Among these pre-conditions would be relatively greater attention to current health and nutritional needs of children; some minimal level of early intervention program quality (to be discussed more fully later); likelihood of enrolling in primary school soon after early childhood program participation; availability of a complete primary school, and at least minimally adequate learning conditions.

Evidence from the Developing Countries

In this section we review evidence from the developing countries examining whether participation in early childhood intervention programs— principally those with an educational focus— can increase children's chances of enrolling and staying in school, and perhaps school achievement. We will discuss studies in 3 groups. The first is a group of nutrition-related interventions with relatively sophisticated designs and less assailable internal validity. The second group, largely preschool interventions, are weaker methodologically, but more generalizable as models. Within the second group are a variety of program types, ranging from small-scale demonstrations to municipal or nation-wide service programs. A third group of studies are included that we call "program notes". These represent partial reports from what appear to be promising programs, that we were not able to verify or learn more about. As noted earlier, most of the studies to be reviewed took place in Latin America.

Nutrition-Related Interventions

The three intervention studies to be reviewed here were born "from academic concerns regarding the effects of PEM (protein energy malnutrition) on behavioral development" (Pollitt, Halpern, & Eskanasy, 1978, p. 52). Two of the three—the Cali Study (McKay & McKay, 1983) and the Bogota Study (Ortiz, 1983; Herrera, et al, 1980; Super, et al, 1983)

included health surveillance, nutritional supplementation and an educational intervention. The third, the INCAP Guatemala Study (Klein, 1979; Balderston, 1981), involved only the health surveillance and nutritional supplementation.

1. Cali, Colombia

In the Cali Study 333 children were selected from a population of 449 potential subjects in the city's lowest income area, on the basis of (1) lowest height and weight for age; (2) highest number of clinical signs of malnutrition; (3) lowest per capita family income. These children received either 1 year of treatment beginning age 6, 2 years beginning age 5, 3 years beginning age 4, or 4 years beginning at age 3. Treatment consisted of 6 hours a day of center-based preschool education, with nutritional supplementation, health surveillance, and nutrition/health education integrated in to the daily program. Two control groups were established, one low income, normal weight and height (N = 116), one high income (N = 38).

All four treatment groups in this study demonstrated significantly greater growth than low income controls in general cognitive ability during and immediately after the treatment periods. Magnitude of gains was related to amount (and age of onset) of treatment. Modest, albeit diminished I.Q. effects were found to persist at least up to age 8.

The Cali investigators managed to follow the majority of treatment children and a minority of low income controls up to age 10. Although attrition was a problem in all treatment groups, particularly the low-income control group, the Cali investigators report that it did not change the original characterisitcs of each group. The McKays report that children followed up (N = 274) have attended a total of 93 schools, many switching schools more than once. Part of the treatment group had a special primary program designed for it. Many children, particularly low SES controls, have attended private "backyard" and "bench" schools, being unable to enroll or stay in the public system. In these settings children are likelier than in public settings to be "promoted," even though they may have the least academic ability. In other words, the demands of formal schooling in this study were not a constant, with which children with different entering characteristics interacted.

With all these provisos, the McKays report that treatment group children were slightly more likely than low income controls to be promoted through the first three grades. Tables 5 and 6 summarize school progress for the different groups through age 10. The Cali investigators also found a significant relationship between I.Q. at age 8 and grade level at age 10, independent of treatment condition. In general, the magnitude of school progress effects was very modest, in relation to the magnitude of the investment in the early intervention treatment.

2. Bogota, Colombia

In the Bogota Study 443 families from the Bogota barrios, with women in the first or second trimester of pregnancy, and previous malnourished children under age 5, were assigned randomly to 1 of 6 treatment conditions: (1) no treatment, (2) supplementary nutrition from the 6th month of pregnancy to age 6 months, (3) supplementary nutrition from the 6th month of pregnancy to age 3 years; (4) supplementary nutrition from age

Tables 5 and 6

Evidence of School Progress Effects
from the Cali Study

Table 5. School failure each academic year from 1974-77 by study group.

Group*	Proportion of children failing the year		
	1974-75	1975-76	1976-77
T4	0.18	0.24	0.27
T3	0.39	0.26	0.23
T2	0.32	0.27	0.30
T1	0.26	0.37	0.24
T0	0.32	0.41	0.35

Table 6. Average grade level at the beginning of each school year for study group children with continuous attendance, 1974-77.

Group	1974-75	1975-76	1976-77	1977-78	No.
T4	1.0	1.8	2.5	3.2	45
T3	1.0	1.8	2.4	3.2	41
T2	1.0	1.7	2.5	3.1	37
T1	1.0	1.7	2.3	3.0	76
T0	1.0	1.7	2.3	2.9	37

* T0: low income control T1: 1 yr. treatment T2: 2 yrs. treatment
T3: 3 yrs. treatment T4: 4 yrs. treatment

Source: McKay & McKay, 1983

6 months to age 3; (5) early stimulation (through maternal tutoring) from birth to age 3, and (6) supplementary nutrition from the 6th month of pregnancy to age 3, plus early stimulation from birth to age 3. All families received medical care. The food supplement was provided in store-like neighborhood feeding stations, in amounts that would meet all family members' daily needs, and assure targeting where aimed. (Substitution and re-distribution nonetheless did occur.) The early stimulation/maternal tutoring consisted of twice-weekly home visits by trained para-professionals, who focussed on modelling of parent-infant interaction for the mother, suggested play activities, and engaged in direct stimulation of the infant or child. Attrition left a sample at age 3 of 339 children.

Supplementation and maternal tutoring in different combinations were associated with improved cognitive abilities in various domains at ages 18 months and 3 years, with the strongest effect found for the full supplemented and home visited group. Prenatal supplementation had a very modest (60 gram) effect on birth weight. Supplementation was also associated with improved physical growth at 3 years. The home visiting program had significant positive effects on the quality of mother-infant interaction (e.g., verbal interaction, contingent responsiveness, affect) in both supplemented and unsupplemented groups. Behavioral effects were greatest for supplemented infants, who theoretically had more energy with which to respond to their mothers' new skills.

The Bogota investigators (Herrera & Super, 1983) report findings for 269 children in an age 7 follow-up that included anthropometry, administration of a school readiness test (reading readiness, math, basic knowledge), and data collection on school enrollment, progress, and performance. Attrition from age 3 to age 7 was not random: families in which there were higher levels of paternal education were systematically more likely to have been lost. The follow-up apparently focused on treatment groups (1), (3), (5), and (6).

The school readiness test was administered to 174 children aged 5.6 to 8.7 (scores were adjusted for age). The investigators found a small, but significant overall positive effect of nutritional supplementation on readiness test scores (with or without maternal tutoring). Effects were larger at lower levels of father's education. There were no independent effects of maternal tutoring on test scores.

There was an important effect of maternal tutoring on age of initial primary enrollment. Mean enrollment age was: 5 years for the maternal tutoring group; 5.6 years for the maternal tutoring/nutritional supplementation group; 5.9 years for the supplementation group; 6 years for the control group. There were also significant positive effects of supplementation and tutoring, alone and combined, on 1st grade repetition. Children in all 3 intervention groups repeated at about a 4 percent rate, in the control group at a 13 percent rate. There were no significant overall intervention effects on teacher-assigned grades in 1st grade.

Significant positive effects at age 7 were found for supplementation and maternal tutoring, alone and combined, on height-for-age and weight-for-age. The positive effect of maternal tutoring alone on growth at age 7 was a new finding; there had been no effects at age 3. The maternal tutoring effects on growth were greatest at the lower levels of father's

education. Maternal tutoring alone and with supplementation was also associated with higher levels of protein and to a lesser extent calorie intake at age 7.

Reviewing the whole pattern of findings at age 7, the investigators speculate that nutritional supplementation has more general long-term effects on children—for example on level of activity, alertness, social cooperation; whereas maternal tutoring has more selective effects—perhaps (through effects on maternal-child interaction) on children's "familiarity with a school-like learning paradigm of interaction with adults." They reiterate that the largest effects in most domains appeared to be found among the most disadvantaged children.

3. Guatemala

While the Cali and Bogota interventions were a mixture of education, nutritional supplementation, and health surveillance, the Guatemala INCAP Study was exclusively a nutritional supplementation intervention. It is included here because it has managed to follow children into their school careers, and because it represents another legitimate early intervention option. In the INCAP Study (Klein, et al, 1972; Klein, 1979) nutritional supplementation was begun during the first trimester of pregnancy, and continued for index children up to age 7. Two rural villages in Guatemala were assigned a high-protein, high calorie supplement; two villages a no-protein, modest calorie supplement. The supplement was administered daily at the feeding stations (in Bogota families took it home), and amounts ingested were recorded. Total sample size was originally 671 children; about 450 children were followed longitudinally.

The INCAP team report that high supplement intake had significant effects on birth weight; on children's physical growth (height and weight) up to age 7; and on children's cognitive development up to age 3. (There is some debate about whether the calories or protein were more important.) Cognitive effects appeared to decrease in magnitude and generality beyond age 3. High supplement intake had no significant effect on verbal development at ages 5, 6, or 7, on early school progress, or on school performance. In 3 of the 4 participating villages in which parental education levels were moderately higher amount of supplement intake was predictive of likelihood of school enrollment. (Klein, 1979; Balderston, 1981.) The apparent mechanism at work here was parents with a more positive perception of the utility of schooling, selecting their bigger, healthier children for enrollment.

Preschool Intervention Studies

The next group of studies to be summarized were non-experimental evaluations of naturally occurring service/demonstration programs. In these studies children were not assigned to treatment conditions. Rather, the investigators identified groups of children already participating in an early intervention program; attempted to match them to peers who were similar but for participation; and prospectively or retrospectively followed both groups into the early primary school years. The findings of these studies should be viewed cautiously. Frequently, participating children and comparison group peers seem to be drawn from different populations, and thus may be initially different in important characteristics. Measures used are often not identified; when identified,

psychometric properties and administration procedures are often not described. Children are often dispersed non-randomly to many primary schools; thus differences in promotion criteria may bias findings. Finally, the studies tend to focus only on initial adjustment to primary school.

In spite of the design limitations this group of studies sheds light on many of the factors that influence children's early school careers in developing countries. As with the nutrition-related interventions, most of the studies to be reported here took place in Latin America. We also report results from Morocco and Althone, South Africa.

1. A Four-Country Study: Argentina, Bolivia, Chile and Colombia

Filp and Scheifelbein (1982) report on a study coordinated across Argentina, Bolivia, Chile, and Colombia, in which children who were enrolled in preschools and kindergartens were compared with 1st grade peers who had not participated. Outcomes examined included age of enrollment, readiness at start of grade 1, promotion, and reading/writing ability at end of first grade. The investigators also examined whether the "socio-economic status" (SES level) of preschools and primary schools—based on students' family backgrounds—was associated with particular kinds of teaching/lerning experiences; whether teaching/learning approaches were generally different in preschool (or kindergarten) and 1st grade classrooms; and what prior characteristics of children generally affected the outcomes being examined.

To construct their samples, the investigators in each country started with preschool and kindergarten classes that operated either half- or full-day; 40 classes from Argentina, 52 from Bolivia, 62 from Colombia, and 40 from Chile. This gave them an original sample of 2595 children ages 4-7, about 40 percent of whom were poor. Between the end of the preschool/kindergarten year and enrollment in 1st grade the investigators lost half of their original sample of children. In 1st grade they identified an additional sample of children who had participated in preschool, and a sample of non-participant peers, drawn from the same and other 1st grade classes.

Given this general design and the enormous attrition from preschool to grade 1, it is probable that the treatment and control samples of children differed significantly on prior characteristics. Indeed, Filp and Scheifelbein note that participants in Chile and Argentina were at slightly higher SES levels within general SES groups than non-participants. Nonetheless, this was a relatively rich and complicated study, with a number of interesting findings.

Preschool observations revealed that the socio-economic make-up of the population served in each country affected the nature of children's experiences somewhat differently. In Argentina, preschools serving wealthier children had smaller class sizes, and more active, child-centered learning. In Chile there were no class size differences, but as in Argentina, teachers assumed a more didactic role in preschools serving poor children. In Colombia, preschools serving the poor had less well-prepared teachers. In Bolivia there were few differences by children's SES. Preschool in Chile and Argentina tended to reflect rehersal for first grade. In Bolivia especially, but also in Colombia, children's health and

nutritional needs, being more pressing, received relatively more attention. In general, the higher the per capita income of the country, the greater the differentiation in preschool services by students' SES.

In all 4 countries, preschool/kindergarten was more child-centered, and children received more individualized attention, than in first grade. There was greater similarity in teaching/learning processes in first grade across all 4 countries, than in preschool. Filp and Scheifelbein also report that even when located in the same building preschool/kindergarten and 1st grade classes were very different in atmosphere.

Participation in preschool/kindergarten was found to have significant positive effects on age of 1st grade enrollment across social class (but especially for lower SES chiildren) and urban/rural populations in Argentina and Chile; negligible effects were found in Colombia and Bolivia. Participation likewise had significant positive effects on school readiness at entry into first grade in Argentina and Chile, but not in Colombia and Bolivia. (Preschool participants in Colombia and Bolivia appeared to be significantly more likely than those in Argentina and Chile to have to wait 1-3 years to enroll in 1st grade after participation in a preschool program.) Within the lower SES groups of children, other predictors (than preschool) of school readiness included number of siblings, birth order, housing, and nutritional status.

Preschool/kindergarten participation had a significant positive effect on promotion in Argentina: among low SES urban children 12 percent with preschool versus 27 percent without were retained in 1st grade; among low SES rural children 36 percent with versus 77 percent without were retained. There was also a significant positive effect on dropout rates. Findings from Colombia were also positive: among low SES children in 3 cities an average 10 percent with preschool versus 27 percent without preschool were retained in 1st grade (Chile had a policy of automatic promotion at the time of the study. There were no Bolivian data.)

Preschool effects on reading and writing ability at end of 1st grade differed from country to country. The Argentine investigators found significant positive effects of preschool participation across social class levels. Positive effects were also found in Bolivia, except for marginal urban neighborhoods. In Colombia and Chile preschool effects on developed abilities were negligible.

In summary, participation in preschool, while it did not eliminate or even narrow social class differences, did appear to affect positively age of enrollment and promotion, within social class, with benefits being greatest for low SES rural children. There were significant effects on school readiness at beginning of 1st grade, although these were more selective. There was also selective evidence of effects on developed abilities. Important covariates of all four dependent variables were family size, parental education, and physical health of the children. Preschool effects were attenuated, not surprisingly, when children had to wait 1 or more years to enroll in 1st grade.

2. Fortaleza, Brazil

Feijo (1983) reports on a study in Fortaleza, Brazil, similar to but

better designed than the 4 nation study discussed above. She followed until the end of 1st grade 57 low income children who attended part-time public kindergarten (at ages 6 and 7) for a year and 70 who tried to enroll in the same kindergartens but could not, due to lack of space. She was able retrospectively to match treatment children with control peers on sex, age, birth order, and number of siblings. Pre- and post-tests (language, reading, math) were administered to all children during the kindergarten year and in 1st grade. There was almost no attrition, but upon entry into 1st grade the children were scattered among 8 schools and 26 classes in different parts of the city. Fourteen control children were converted into a second treatment group, receiving a short preparation course before 1st grade.

No significant group differences were found on pre- or post-test scores, in kindergarten or 1st grade for most measures. One test, an "Interactive Reading Assessment" yielded modest differences in favor of the kindergarten group. Significant findings were found for promotion to 2nd grade: in the kindergarten group 64 percent were promoted; in the short-training group 50 percent were promoted; in the control group 34 percent were promoted. Females seemed to benefit most from the kindergarten experience.

3. Peru: The Puno Project and Its Extension

Myers and colleagues (1985) report on a multi-faceted evaluation of a large-scale, government-sponsored preschool education program in Peru. In the program, 3 to 5 year old children are brought together for 3 hours, 4 or 5 mornings a week in centers called PRONOEI (Programas No-Formal de Education Inicial). They receive education and care from a minimally trained community volunteer as well as a snack and/or noon-time meal. Mothers prepare a daily snack and/or noontime meal. The volunteer, who is selected by the community and receives a modest stipend, is supervised by Ministry of Education staff.

The PRONOEI program, which originated in the early 1970s, was seen by the Peruvian government as a realistic means of reaching Peru's poor children with preschool services, and as a catalyst for broader community participation. PRONOEI coverage grew steadily from 1975 to 1985, with coverage currently approaching 200,000 children in 6000 small centers, served by 8000 "promotores," and 800 "coordinadores." Current coverage represents about 10 to 15 percent of the 3 to 5 year old population.

In 1984, an evaluation was carried out of approximately 2000 PRONOEI receiving assistance from USAID and UNICEF (as well as from the Peruvian government). The evaluation found a modest, but significant impact on the cognitive, social and motor development of participating children in some, though not all, of the communities studied (see below). Moderate and indirect effects were found on the nutritional status of children. There were also some community-level effects; specifically, the program served as a catalyst for creation of new community groups— mothers' clubs, parent associations, and nutrition clubs; and also affected the topics of discussion in community meetings. However, no significant effects of PRONOEI participation were found on primary school repetition rates.

The evaluation design included: interviews with parents, volunteers

and community leaders in 148 PRONOEI communities; detailed observations of daily activity in 12 PRONOEI; tests administered to 334 children in 26 matched PRONOEI and non-PRONOEI villages in 3 states, including a sample of formal preschool participants; analysis of children's PRONOEI and 1st grade school records; height and weight measurements; and parent interviews for tested children. Communities were selected using a stratified random sampling procedure; stratification was based on accessibility, socio-economic characterisitcs, and program duration. The test used was criterion-referenced, and was specially designed to reflect PRONOEI curriculum objectives, as well as general developed abilities in the psychomotor, intellectual and social domains.

Children attending PRONOEI were compared with children of the same ages from non-PRONOEI villages in each of three Peruvian states— Puno, Cuzco, and San Martin. An attempt to match children in terms of their social backgrounds was successful for the Puno children; but in the latter two states parents of non-PRONOEI children were more apt to have completed primary school. Results of the PRONOEI/non-PRONOEI comparison were most promising for Puno, where the two groups were matched, and where the program is the most mature (11 years in operation) and most widespread (in over 1000 rural communities). In Puno, in both Aymara- and Quechua-speaking areas, PRONOEI children performed significantly better than non-PRONOEI children on the intellectual, social, and motor sub-scales of the test administered. These differences were found in spite of an evaluation finding that the quality of the PRONOEI program was generally low, as judged by the teaching skills of the promotors, the time devoted to educational activities, the avaiability and use of materials, and the quality of supervision of the promotors by Ministry of Education staff.

No effects of PRONOEI participation were found on promotion from 1st to 2nd grade, or from 2nd to 3rd grade. Effects favoring PRONOEI participants were found on age of enrollment. Repetition of 1st grade was extraordinarily high—over 50 percent—in the PRONOEI and the control villages in the sample. Moreover, 25 percent of children who repeated did so more than once. In some communities, repetition rates for 1st grade approached 100 percent. The evaluation team was not able to examine the reasons for these extraordinary repetition rates. These were largely rural regions, where repetition is usually highest. As discussed earlier, repetition rates like these are often structural— inherent in the local school situation, minimizing the role of individual characteristics or abilities in determining children's promotion.

The above findings are largely, but not wholly, consistent with results from two earlier studies in Puno (Aliaga, 1981, 1983). The first of the studies examined grades assigned by teachers to PRONOEI and non-PRONOEI children, and found no differences. The second involved administration of a special test of mathematical and language ability to primary school children who had participated in the PRONOEI program and a control group of peers. No differences were found between the two groups.

The PRONOEI experience illustrates the importance of a coordinated investment strategy linking expansion of preprimary education to qualitative improvement of primary education. It also illustrates the complex relationship between quality and coverage in the growth of early

childhood intervention programs in the developing countries. Is it appropriate, for example, to promote a national early childhood service program, even one based on significant community contributions (i.e., the volunteer teachers), when the technical resource back-up for that program is not dependable? What quality and quantity of work is reasonable to expect of the community volunteer, in any case? Could a community-based program target particular children for service, and deny others? Among the more interesting recommendations of the evaluation team: establish an intermediate, paid role—the assistant teacher/coordinator—for volunteers to aspire to; use early morning radio spots to help the volunteers plan daily activities; use experienced volunteers to help adjust the curricular guides.

4. Morocco: Modern and Quranic Preschools

Wagner and colleagues (1984) are currently conducting a longitudinal study of literacy acquisition in Morocco, for which they have followed children with different early childhood experiences into their primary school careers. Their sample consists of 378 children from 5 groups: an rural group and an urban group who participated in Quranic preschool programs; an urban group who participated in modern preschool programs; and an urban group and a rural group with no preschool program experience. In constructing their original samples the investigators controlled for social class; they report that the modern preschool group comes from families more likely to be employed in the modern sector. (The "preschool" programs involved typically serve children 5 to 7 years old, in that sense being more like kindergarten. In Morocco, about 30 percent of children 5 to 7 are enrolled in Quranic preschools, and about 15 percent in modern kindergartens.

The investigators are administering a battery of achievement and general ability tests to children at the end of each grade, as well as documenting promotion patterns. They are currently analyzing data from the second year of primary school. Analyses of 1st grade achievement data indicated that rural Quranic preschool children performed significantly better than non-preschool peers on most achievement/ability test scales. In the urban setting group differences were less clear-cut; the modern preschool group performed moderately better than the other two on most tasks, but few differences were found between Quranic preschool and non-preschool groups. Second grade anlyses, currently underway, suggest some attenuation of the findings in both rural and urban areas, though the investigators warn that these findings are tentative.

With respect to promotion rates, the investigators found no group differences among the five groups. This was somewhat surprising, given differences between the two rural groups and between rural and urban groups more generally in reading readiness and other test scores. The investigators suggest that the politics of schooling and a quota system for promotions may "obscure all but the most general differences in academic achievement and skill development" (Wagner & Spratt, 1984, p. 9).

5. Althone, South Africa

Short (1985) reports on a Bernard van Leer Foundation supported initiative in Althone, South Africa. The program, called the Early Learning Center (ELC), served mainly disadvantaged "colored" children (classified as mixed race). Its main component was a daily 6 hour center-

based preschool program for 3 to 6 year olds, that included health surveillance and nutrition supplementation. Children participated from 1 to 3 years. At the end of 1st grade ELC participants and untreated school peers (selection strategy and number sampled not reported) were administered the Pupil Behavior Inventory (Sarri and Radin). Positive effects favoring ELC children were found on inquisitiveness, social adjustment and motivation, but not on academic-task-related behavior. By age 15, 40 percent of a sample of 60 ELC participants had reached Standard 8 (grade 10) without repeating a grade, compared with a national norm for coloreds of 25 percent. By age 17, 32 percent had entered Standard 10 without repeating, compared with the colored norm of 10 percent. Girls benefited from the ELC program more than boys, and moderately deprived children more than severely deprived children.

6. Osorno, Chile

Walker (1983) and Richards (1985) report on an evaluation of the Parents and Children Program (Programa Padres Hijos) in Osorno, a rural area of central Chile. In the program, which has been implemented in 52 rural communities, locally chosen volunteers, acting as facilitators, brought participating parents together on a weekly basis to discuss problems related to childrearing. The problems and concerns raised by parents were then used as the basis for preparation of a series of radio dramas. Ongoing weekly meetings were keyed to radio broadcasts designed to complemnt discussions. Local facilitators also were provided with worksheets for parents to use with their children. The idea underlying the program was to improve child development through improved community organization and personal development of parents, as well as through parent education for childrearing.

The evaluators report that in 1st grade, teachers (who did not know the children's history) were asked to rate the reading skills (not specified) of a sample of 29 children of participating mothers and 49 peers (selection procedures not described). Nineteen percent of the treatment children were rated as excellent readers versus 4 percent of controls; 52 percent were rated as good readers versus 35 percent of controls; 31 percent as fair readers versus 44 percent of controls; and none as poor readers versus 12 percent of controls. Treatment children also performed better than untreated peers on a Draw-A-Figure test.

Program Notes

Thus far, we have reported evidence from evaluations whose methods as well as results could be examined. In the course of our inquiries, however, we encountered brief reports of evaluation findings for which we were not able to acquire full reports that included program descriptions and research designs (at least in time for this review). We nevertheless present these unverified reports here. Taken together they suggest the same uneven, but promising, pattern of results reported thus far.

Note 1: Haiti

A follow-up study was undertaken of children who participated in a preschool project funded by USAID and implemented by CARE-Haiti. The preschools were set up as an element of Community Integrated Nutrition and Education Centers (CINEC), themselves created in communities where the

World Bank was funding the construction of new primary schools. The CINEC project team reports that 86 percent of the preschool participants have completed the 4th year of primary school, compared with a "general" completion rate of 30 percent. An earlier progress report from the same project indicated that CINEC (not differentiated from preschool) children had a promotion rate of 87 percent, compared with a "general" rate of 37 percent. Moreover, "school directors and the first grade teachers unanimously agree that the CINEC children are more alert, more eager to learn, and better assimilate the different concepts of math, reading, and writing" (CARE, Haiti, 1982). Nonetheless, one reviewer of the earlier progress report suggested that CINEC and non-CINEC children attending the same primary school had about the same repetition rate, suggesting that primary school effects may be attributable to differences in primary schools as much as differences in children.

Note 2: Brazil

An audio-visual presentation from the UNICEF office in Brazil dealing with preschool education includes figures from a study carried out in Rio de Janeiro involving approximately 1000 children. The researchers in this study apparently found that 28 percent of children with preschool program experience failed first grade versus 60 percent without preschool experience. Again, we do not know how these two groups compare in background characteristics.

Note 3: Brazil

Since 1977, a portion of a World Bank nutrition loan to Brazil has been used to support early childhood education and supplementary feeding for 4 to 6 year olds. These activities have been carried out through PROAPE (Programa de Alimentacao do Pre-escolar), with the goal of enhancing school participation rates and school achievement. The follwing comes from a report on the lessons learned from this World Bank project: "A careful evaluation of the CEAPE program (the prototype for PROAPE) in the Municipio de Leme in Sao Paulo) suggested that....school performance scores were better and repetition rates were lower among CEAPE children" (p.13).

Further: "The percentage of former PROAPE participants who passed in the first and second years of elementary school was 73.5 percent compared with only 59.5 percent in the control group. In terms of academic performance, children with two years exposure to PROAPE performed consistently better than control groups."

Note 4: Malaysia

A study carried out in Malaysia by the Ministry of Education (with funds from UNICEF)to examine the effects of preschool attendence on primary school achievement "....seems to have established that children attending kindergartens perform better than other children in the early stages of primary schooling. How much this is due to what they learn in the Kindergarten and how much can be attributed to the fact that they are a selected group is not clear at present" (Crellin, , p.2).

Note 5: Bangladesh

The following comes from a USAID project identification document discussing females' access to education: "The Meher Universal Primary Education Project in Bangladesh expanded educationalal opportunities by establishing small-scale feeder schools serving as preschools and early

primary centers, employing local women teachers thus lessening the burden on the crowded first grade of the established primary school, increasing female participation rates and reducing wastage rates" (USAID, 1984, p.).

Summary of Evidence from the Developing Country Studies

As we noted at the outset, this review is a first attempt at drawing defendable generalizations about the effectiveness of early childhood interventions in enhancing children's school careers in the developing countries. We have pointed out many of the limitations of available evidence, and will not reiterate them here, except to note that these limitations imply a need for international donors to support a careful program of research and development in this general area. Limitations not withstanding, we are able to draw some "first order" conclusions.

The available evidence of the effects of early childhood intervention yields a picture of modest positive effects on initial adjustment to the demands of the primary school. The particular mechanisms enhancing this adjustment appear to reflect some combination of earlier age of enrollment, improved school readiness and more selectively, improved health and energy level (thus, presumably, attendance as well). Changes in parental knowledge and attitudes are hinted at in a few studies, but their contribution to children's initial adjustment is largely undocumented. Only the INCAP study reports positive effects on absolute likelihood of school enrollment; most studies had no data on this variable.

The most striking finding suggested by the present review is that structural features of the primary school systems (promotion quotas, teacher attitudes, low quality instruction, resource inadequacies, and so forth) seemed rapidly to overwhelm any early childhood intervention effects. Children's individual abilities and physical integrity still played a role in influencing early school progress in studies reviewed, but within a much narrower and absolutely lower range of variance in possible outcomes.

The evidence is not sufficiently broad or detailed at this point to draw conclusions regarding the kind of early childhood intervention most likely to benefit children (holding quality constant) under the circumstances found in most developing countries. A daily educational program, with nutritional supplementation and health surveillance, were the most common elements of programs reviewed. Since individual studies addressed different questions, the findings across studies were not cumulative with respect to preferred combinations of inputs and procedures.

There is suggestive evidence in a few studies that relatively more deprived children benefited more cognitively and socially than their less deprived peers. Unfortunately, these same children were also more likely to attend the poorest quality primary schools, making these effects short-lived.

Policy Dilemmas: Toward a Reasonable Program of Investment

The evidence discussed in this review reconfirms that for many children in the developing countries the transition to primary school is a difficult one. Both the personal resources that children bring to school and the conditions of primary schools themselves present obstacles to a successful adjustment. The personal and social costs of this poor adjustment include continued high primary school repitition and dropout rates, and consequently another generation of functional illiterates, an expanding base of minimally flexible and adaptive human resources, and a reproduction of the survival-oriented parenting that the current generation received. This likely scenario leads us to suggest that improving poor children's adjustment to primary school should be a central policy goal of developing country governments and international donors during the reaminder of this decade at least.

Within such a framework, early childhood intervention programs have a number of modest, but crucial, roles to play. The first and most obvious is to improve poor children's skills and energy to cope with the cognitive and social demands of formal schooling as a developmental setting; as in the U.S. case, to assure a more positive initial school experience. A positive initial school experience can boost a child's psychological capacity to cope with subsequent school demands, including those created by school system dysfunctionalities.

A second role for early childhood interventions is to provide pedagogical models for early primary practice; to extend the early childhood practitioner's view of children's needs, and consequently the role of the teacher implied by such needs, into the first two years of the primary school.

In a more ambitious vein, it is possible to imagine an integrated early childhood-early primary program that has as a central objective hooking children in to the formal educational process. Such a basic reorientation would require a research and development program-- funded by international donors in most cases-- that that began with an examination of what happens to children currently during the transitional years (5 to 8); what teachers do, why they do it, and the effects of their behavior on children.

An integrated early childhood-primary program could serve as a vehicle for linking family and community interests and strengths to the formal schooling system; for example, infusing the values and content of the local culture into the curriculum, at first at the preprimary then at the primary level; serving as a focus for community development energies that, once organized, could also be focused on other issues; involving teachers in the solution of community problems linked to child development but not obviously part of the formal school system's mandate; reaching parents and their children with educational services before the perceived costs of children's participation in a process with ill-defined returns becomes too high.

Beyond envisioning an integrated early childhood-primary program lie a number of thorny problems: Should the early childhood program fall under

the jurisdiction of the primary school establishment (i.e. the Ministry of Education), running the risk of becoming simply a downward extension of current primary school practices? Should experienced child development specialists and early childhood educators be placed in positions of authority within the primary system's bureaucracy, and be asked to re-think and re-design an early primary program from the ground up? Should private early childhood programs be integrated into the formal educational system? Should two separate systems be maintained, with mechanisms such as a common curriculum and common teacher training courses being used to encourage continuity?

We believe that it would be premature to urge an integration of early childhood intervention programs into Ministries of Education; there are too many dangers in such an approach. But we feel strongly that the first two years of primary school present too radical a departure from prior experience for many children. Creating a transitional level of formal education that served children in the 4 through 7 age range would only work if an autonomous unit linked to but with some independence from the Ministry of Education could be established. Perhaps structures currently used in England-- for example the Infant Schools-- could serve as a model.

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